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Exhibit DJ-1: Vita of William B. Shew	

1 Christensen Associates. Professor Bradley has estimated how the direct labor and
2 overhead costs of mail processing vary with mail-processing volumes aggregated over all
3 classes of mail. Mr. Degen has taken those estimates and distributed them across
4 individual mail services, using various assumptions. The new methodology produces cost
5 estimates for individual postal services that often differ noticeably from the estimates
6 produced by the traditional methodology that the USPS has used in the past.

7 I have been asked to assess the new methodology for estimating the mail
8 processing costs of postal services and to evaluate its suitability as a basis for developing
9 new postal rates. To that end, I have reviewed the methodology to determine whether it
10 seems reasonable and consistent with the principles recognized in economics for properly
11 measuring service costs. In performing my review, I have drawn on my experiences
12 estimating service costs in regulated industries and in working with companies and
13 regulatory agencies to develop the cost information necessary for rate regulation to work
14 well.

15 To preview my conclusions,

- 16 1. Professor Bradley and the USPS are to be commended for empirically investigating
17 how mail processing costs vary with volume, instead of simply assuming “100 %
18 variability” – an assumption that this important research reveals to be quite wrong.
- 19 2. In contrast to Professor Bradley’s study, Mr. Degen’s contribution, on the
20 challenging task of identifying the mail processing costs of individual service
21 subclasses, relies far less on empirical investigation, and instead makes extensive

1 use of assumption. Less than half of his cost assignments to individual services
2 appear to have a basis in fact, and the majority of costs are assigned to service
3 classes on the basis of untested, seemingly arbitrary assumptions.

4 3. For his assumptions to be correct, the cost of mixed mail and of staff not handling
5 mail in any one cost pool must be (a) unrelated in any informative way to the
6 activities in any other cost pool and (b) distributed identically to the documented
7 costs within the cost pool. Mr. Degen does not offer a reason that should be so, and
8 I cannot think of one.

9 4. Using arbitrary assumption to allocate costs to services should not be confused with
10 actually measuring the costs of individual services and does not provide a sound
11 basis for developing rates. Simply “assuming” what the costs of services are
12 constitutes a determination not of cost but of cost-recovery, which usurps the
13 regulator’s role of deciding how costs should be recovered that are not clearly
14 identifiable with individual services.

15 5. The USPS should be strongly encouraged to develop data to determine the costs
16 caused by each service subclass, something that need be no more onerous than the
17 current system for collecting cost information, which does not always seem well
18 suited to identifying service costs.

19 6. In the meantime, the Postal Rate Commission may want to consider whether some
20 better cost foundation is available for developing rates in the current case. One
21 possibility is to retain the USPS’s cost study, but to eliminate its speculative

1 allocations, classifying as institutional costs all costs not clearly identifiable with
2 individual service classes. Or one might seek a middle ground between that and the
3 Postal Service's proposal to rely extensively on untested assumptions. That would
4 mean a methodology that, although not free of assumptions, makes better use of
5 existing information and yields results that are less sensitive to untested
6 assumptions than the methodology advanced by the Postal Service.

7 The organization of my testimony is straightforward. I will begin with some
8 insights that economics provides into the kind of cost information needed for good rate
9 regulation. After reviewing the key role that costs should play in setting prices, I will
10 discuss important differences between service cost as measured by causal responsibility
11 and the pseudo costs that emerge from assumption-driven cost allocations. With that as a
12 backdrop, I will offer some thoughts on the new USPS cost methodology, and suggest
13 ways to develop a firmer cost foundation for rate-making.

14 I. Why Good Cost Information is Important for Good Rate Regulation

15 On the rare occasions that economists exhibit anything resembling religious
16 fervor, they are likely to be declaiming on the working of the price system. As viewed by
17 economists, prices do far more than merely lighten the pocket or purse. They play a vital
18 role in determining how efficiently the economy makes use of its resources. Prices
19 influence the demand for individual goods and services and how that demand is
20 distributed across competing suppliers. If prices do not suitably reflect cost, the danger
21 arises that purchasers will consume too much of one good and too little of another, or

1 take their business to less efficient suppliers, with the result that the economy's limited
2 resources are not efficiently used.

3 A simple example may be helpful to illustrate (1) the impact of prices on the
4 efficiency with which resources are used and (2) the measure of cost relevant to providing
5 customers with appropriate price signals. Suppose that oranges and pears each require \$1
6 of real resources to produce, but oranges are priced at \$.50 and pears at \$2. At a \$.50
7 price, consumption of oranges would be wastefully excessive, since consumers to whom
8 oranges are worth as little as 50 cents would be encouraged to buy them, even though
9 each one absorbs \$1 of the economy's resources to be produced. As for pears, pricing
10 them at \$2, well above their \$1 cost, would also be wasteful, since it would discourage
11 consumers from buying pears that they value more than their production cost. Thus,
12 prices that do not appropriately reflect cost can lead to a costly waste of resources, by
13 unduly encouraging or discouraging consumption.

14 The appropriate relationship between service cost and price depends on a number
15 of considerations. In industries with high fixed costs, setting prices above variable costs
16 may be necessary if a supplier is to recover all its costs. And for services creating
17 spillover benefits for society, a strong case exists for setting lower prices than otherwise
18 would be appropriate. These considerations, along with others that Congress insisted be
19 taken into account in setting postal rates, all affect the efficient relationship of prices to
20 costs. But each service's true cost – the cost that would be avoided if the service were
21 not offered – is inevitably the appropriate point of departure in establishing suitable

1 service rates. If service costs are not known accurately, then no sound basis exists for
2 setting postal rates.

3 The cost measure relevant to giving customers suitable price signals is the cost
4 actually *caused* by providing a service, which can differ sharply from the cost that is
5 “allocated” or “distributed” or “attributed” to a service. The cost caused by the service –
6 the cost that would be avoided if the service were not provided – constitutes the bedrock
7 information necessary to formulate fair and efficient prices.

8 Measuring service costs accurately can be impeded by several complications.
9 Consider the matter of service definition. The costs incurred in providing seemingly
10 identical postal services can differ markedly. For instance, the cost of transporting a
11 letter 700 miles can depend on whether its destination is Chicago or Cedar Rapids.
12 Defining services narrowly enough to produce (practically) identical costs within a
13 service category would necessitate an impractically large proliferation of defined
14 services.

15 A closely related issue is how best to define service volumes in a cost analysis.
16 Since the focal question about cost is how it is affected by a change in service volume, a
17 decision must be made about whether the quantity of a postal service is most
18 meaningfully measured by (say) the number of pieces, their aggregate weight; their
19 aggregate transport distance, or (more likely) some combinations of those and other
20 factors.

1 While these are matters that must be confronted in quantifying a complex cost
2 structure, they present no real obstacles to obtaining the cost information necessary for
3 efficient service pricing. True, they require good practical judgment in order to obtain an
4 accurate portrayal of the cost conditions of the regulated firm. But the need for a
5 thoughtfully designed study should not be an obstacle to reliably ascertaining service
6 costs.

7 When serious impediments to accurately determining service costs do arise, their
8 source almost invariably is a lack of adequate data to identify the costs that are caused by
9 each individual service. The remedy is straightforward. First, identify the data that
10 would permit individual service costs to be accurately quantified. Then set up a system
11 to collect and compile the needed data.

12 Doing that, admittedly, requires work. Data requirements can most safely be
13 identified by designing the cost analysis in advance – specifying the service definitions to
14 be used in the analysis, the variables that will be employed to explain costs, the level of
15 aggregation at which service volumes will be related to costs, and so forth. Then there is
16 the chore of establishing a system to collect and compile the necessary data. None of that
17 is easy. But then, neither is the current set of arrangements for collecting cost data and
18 using assumptions to construct large, complex models to allocate costs. In short, the
19 excuse is becoming threadbare that arbitrary cost allocations must continue because no
20 one has collected the data to determine actual cost causality.

21 As the shortcomings of “allocated” or “distributed” costs have become more
22 widely recognized, there has been a movement within regulated industries to develop data

1 enabling better estimates of service costs. The techniques formerly employed to allocate
2 costs in multiproduct regulated industries are capable of attributing a wide range of cost
3 to any particular service, depending upon the particular assumptions adopted about how
4 costs “should” be allocated and book-keeping conventions, which influence the nature of
5 the cost records that are available.¹ Of course, the true cost of a service does not change
6 with the assumptions adopted. Yet in effect that happens when the facts necessary to
7 determine cost responsibility have not been gathered. For then, the costs recognized for
8 the purpose of regulating rates reflect the assumptions chosen to allocate costs. If service
9 costs are arbitrary, service prices cannot help but be arbitrary as well. And arbitrary
10 service prices are poorly suited to provide customers with the signals that promote
11 efficient use of resources.

12 In short, the value of accurate cost information is hard to overestimate. It is
13 essential in order to set service prices that comport with the statutory standards and
14 encourage Postal Service customers to make economically efficient choices. A cost study
15 relying heavily on untested assumptions is likely to lead to costly waste. In addition,
16 inaccurate cost estimates can be unfair, by leading to overcharges to some customers at
17 the same time that prices to other customers are lower than the true costs that they impose
18 on the system.

19 Private sector for-profit firms understand well the importance of obtaining
20 accurate cost information, as opposed to simply making assumptions about how much

¹By book-keeping practices, I mean the way that data on costs are collected and organized. For example, if the MODS system were replaced by some different system for classifying activities for the purposes of

1 each service contributes to their total costs, since accurate knowledge of service costs is
2 essential to determine profit-maximizing prices. More important yet, in a highly
3 competitive market a firm's very survival can depend on the accuracy of its cost
4 information, since pricing even slightly above or below cost in such an environment can
5 lead quickly to financial insolvency.

6 Regulated monopolies have traditionally lacked such direct incentives to obtain
7 accurate information about individual service costs. Many such organizations have been
8 subject to profit regulation, which eliminates or at least greatly reduces the value of cost
9 information for the purpose of setting profit-maximizing prices. And many regulated
10 organizations have been insulated from competition by a combination of natural
11 monopoly cost conditions and regulatory barriers that make it difficult or impossible for
12 other companies to compete with them.

13 But much of that is changing. New technology is breaking down barriers to
14 competition. And government policy is increasingly loathe to protect "natural"
15 monopolies from competition, whether through outright entry barriers or by saddling new
16 entrants with cost disadvantages. If regulated firms are prudent, therefore, they will
17 growingly emulate their private sector counterparts in the pursuit of accurate cost
18 information on which to base prices. And they should not procrastinate. When regulated
19 companies wait until substantial inroads have been made by competitors before beginning
20 an earnest reform of their operations, it can be too late.

recording cost, that change would probably alter the distribution of cost allocations across services, even though correctly measured costs should not be affected.

II. The Variability of Cost with Respect to Volume

The USPS is to be commended for supporting an empirical investigation of how mail processing costs vary with volume. The easier, but less virtuous, course of action would have been simply to continue to assume that these costs vary in equal proportion to volume – an assumption that this investigation reveals to have been quite wrong. The new study, which was performed by Professor Bradley of George Washington University, provides many interesting insights into cost causation, and one can only hope that its replacement of assumptions with extensive data analysis will provide a model for future studies of postal service costs.

Professor Bradley finds that most mail processing costs do not increase as rapidly as the volume of mail being handled. That discovery should not be surprising, since it is consistent with the traditional belief that there are economies of scale in providing postal services. He estimates the “variability” of costs – the proportional increase in cost relative to volume – for each of 28 categories of mail processing labor costs.² If cost increased in the same proportion as volume, as assumed in the past, then the “variability” of cost would be 100%. His variability estimates range from 15% (registry) to 100% (remote encoding).³ Confining attention to MODS sorting activities, the estimated variability of cost ranges from 40% (manual parcels) to 95% (BCS).⁴ Overall, of the 25 cost elasticities he estimates for mail processing activities, the majority fall within the

²“Variability” is used as a synonym for the elasticity of cost with respect to pieces of mail handled, which is measured by $(\delta C / \delta M)M/C$, where C is cost and M is a suitable measure of mail volume. As I will discuss later, the labor cost that is measured by Bradley, following traditional USPS practices, is labor hours, not payroll costs.

³USPS -T-14, Table 1 at 9.

⁴USPS -T-14, Table 7 at 54.

1 range of 45% to 80%.⁵ All of his estimates are quite precise, indicating that there is little
2 uncertainty about the variability of mail processing costs.

3 His study is notable for its size, consisting as it does of many interrelated steps
4 and a myriad of data details and technical tests. Discussing every facet would run the risk
5 of generating more boredom than illumination among those who are not econometrics
6 devotees. So it seems to me the better course of action is to focus on some of the
7 particularly notable features of the study.

8 A. Data

9 The study makes use of extremely large bodies of data. To analyze the volume-
10 variability of cost, Professor Bradley has designed separate analyses to deal with (1)
11 Direct MODS costs, (2) Allied MODS costs, (3) BMC costs and (4) Remote encoding
12 and registry. (The cost of “Allied” activities in MODS offices must be analyzed
13 separately because there is no direct measure of pieces of mail handled available for
14 them, as there is for “Direct” MODS costs).⁶ The MODS data are drawn from 300 sites,
15 with nine years of monthly observations of mail processing costs and of the factors that
16 help to explain costs. The BMC data cover eight years of monthly observations from
17 each of the 21 Bulk Mail Centers. The data available to estimate the cost variability of
18 remote encoding and registry are necessarily less extensive, because (a) the output
19 measure used for registry is a national total available only quarterly, and (b) remote

⁵USPS -T-14, Table 1 at 9.

⁶ A direct measure of pieces handled can be unavailable either because total pieces handled in an activity is not recorded, as is the case for manual sack sorting and bulk presort, or because there is no within-activity measure of total pieces handled that would provide a meaningful measure of the activity’s output, as is the case for general activities that provide support to a broad range of specific mail processing activities.

1 encoding was introduced only recently, with the result that data from many sites are not
2 available earlier than 1996. But even in the instance of these smaller data sets, the
3 estimated cost equations fit the data very well, and the estimates of cost variability appear
4 to be quite reliable.

5 The opportunity to draw upon a large, rich body of data is of considerable value in
6 estimating cost variability. The richness of the data is due in part to the variation in the
7 scale of mail processing operations between the largest and smallest sites at each point in
8 time, and also volume variations over the time period spanned by the data (usually 9
9 years). Being able to observe the costs of many different scales of mail processing
10 facilitates establishing the precise shape of the relationship between total pieces of mail
11 handled and cost.

12 The large number of observations on cost and total pieces handled that Professor
13 Bradley analyzes also contributes significantly to the reliability of his results. The larger
14 the size of a sample, the smaller is the probability that the sample is unrepresentative of
15 the population it is intended to stand in for. In the current instance, the objective is to use
16 sample data to determine how cost varies with the volume of mail processed by the Postal
17 Service. Professor Bradley's large data sets make it extremely unlikely that the
18 combinations of cost and scale that he observes are atypical.⁷

19

⁷By way of analogy, suppose one wants to quantify how weight varies with height in the population. A random sample of only two people might produce a tall person and a short person who weigh the same, misleadingly suggesting that increases in height are not associated with increases in weight. But as the size of the sample is expanded, the probability of mischaracterizing the general relationship between height and weight due to an atypical sample diminishes very rapidly.

B. Choice of Variables

To determine the variability of mail-processing cost, it is necessary to select measures of the cost and output of mail processing activities. That task is more difficult than it may appear, since in many activities there are several ways that cost and output could be measured, and the most relevant measures do not always have good data.⁸ It is also necessary to identify the factors other than output that could also influence the cost of mail processing, since they must be taken into account in the analysis if the relationship between cost and output is to be identified correctly. The choice of variables to be used in the analysis inevitably involves practical considerations and the exercise of judgment.

An example is provided by Professor Bradley's decision to measure labor costs by hours rather than compensation. Hours are the traditional measure of mail processing costs, but in other industries labor costs are more commonly measured by the compensation paid to labor. Since the cost whose variability Professor Bradley has been asked to determine is *monetary* cost, compensation would be a natural measure of cost here. Professor Bradley uses hours to measure labor costs because, he explains, accurate information on compensation in each mail processing activity was not readily available.⁹ Foregoing the theoretically superior cost measure is never an easy choice to make, and points to the need for the Postal Service to consider redesigning its data collection

⁸For example, the labor cost of an activity can be measured by the physical quantity of labor spent performing the activity (e.g., total man-hours), or by a monetary measure of labor input (e.g., wage costs or total labor compensation, including fringe benefits, pension and so forth). The output of a mail-processing activity can be measured in the aggregate, such as by total pieces handled, or by a disaggregate measure, such as the pieces handled of each type of mail.

1 activities, a matter to which I will return later. But the practical impact of measuring
2 labor costs in hours instead of compensation is probably small, if compensation rates for
3 clerks and mail handlers do not vary over a wide range.

4 Output is measured in the study by the pieces handled in an activity, except in
5 those activities where a more meaningful measure of output exists (e.g., registry, remote
6 coding). For the “allied” activities that support sorting activities at MODS offices, output
7 is measured by the volume of mail sorted by each of the activities being supported. For
8 allied activities, therefore, cost is causally related to multiple outputs, instead of the
9 single output (total pieces handled) used to describe the scale of sortation activities.

10 In order to identify correctly the relationship between cost and output, it is
11 necessary to control for factors in addition to current output that may have influenced the
12 labor hours spent in each activity. The factors that Professor Bradley’s analysis generally
13 takes into account include time trends, the share of the mailstream that is processed
14 manually and output in earlier periods.¹⁰

15 Past Output Explaining current cost partly by past output levels is appropriate if
16 – as is often the case in industry – staffing is adjusted only gradually to changes in
17 output. Professor Bradley’s analysis reveals that past output as well as current output has

¹⁰On page 13 of his direct testimony, he says “I would have had to construct an *estimate* of the average wage paid in that activity, at each site, in each accounting period.” (Emphasis supplied.)

¹¹The share of the mailstream processed manually is omitted in the analysis of BMC costs and the costs of “allied” activities that support sortation. Bradley feels that BMC operations have not experienced a diversion of mail from manual to automated activities, implying that the manual variable would add nothing to the analysis. Since the cost of allied activities at MODS offices is explained by reference to the total pieces handled in each of the major sorting activities (manual letter, manual flat, mechanized letter, mechanized flat and automated letter sortation), incorporating an additional measure of the proportion of the mailstream that is manually processed would appear to be redundant.

1 a statistically significant effect on current cost, confirming that the full adjustment of
2 staffing to changes in mail processing work loads does not occur immediately.¹¹

3 Technology To take into account the possibility that technological change may
4 have altered the labor cost of mail processing activities, Professor Bradley includes in his
5 analysis the proportion of the mail stream that is manual and two time trends.¹² If
6 suitable data had been available, it would have been interesting to examine how labor
7 cost has been influenced by the dollar value of investments in plant and equipment
8 associated with each mail processing activity. Those expenditures reflect pertinent
9 developments (e.g., replacing simple automation equipment with more sophisticated
10 equipment having a greater labor-saving potential) that may not be fully captured by
11 either the proportion of mail being manually processed or a time trend. A further
12 advantage is that one could then obtain a direct estimate of the amount of labor saved for
13 each dollar of investment, providing an objective, system-wide basis for evaluating
14 whether the scale of investments appears to be consistent with minimizing the total cost
15 of the Postal Service's operations.

¹¹Consider, for example, the equation he estimates to explain the cost of sorting manual flats, which is reported in Table 7 of his direct testimony. The coefficients on current pieces handled and past pieces handled are, respectively, 0.75 and 0.12, indicating that sortation costs adjust only gradually to changes in the number of pieces handled.

¹²In addition to serving as a general indicator of technological change, the proportion of mail that is manually processed may affect labor productivity in mail processing in some quite specific ways. It is believed that the mail migrating to automated processing has tended to be mail that has been less costly to process manually than other mail because of such factors as typed addresses presented in conventional form, zip codes, and volume mailings ordered by zip code. As more and more mail migrates out of manual processing, the ease of handling of the mail that remains is felt to continuously decline. That trend is reinforced by the routing to manual processing of the mail that is rejected by automated processing activities, which tends to present unusually difficult sorting challenges. In addition, manual processing is used as a backup to handle overflows when automated processing is stretched to capacity. If manual operations are staffed to handle peak overflows, average labor productivity in manual processing will be adversely affected and the decline in productivity is likely to increase with the size of the largest potential

1 But even the relatively simple formulation used by Professor Bradley yields some
2 interesting conclusions about labor productivity trends. In the majority of mail
3 processing activities, he finds, labor productivity increased from 1988 to 1992, but has
4 declined since then, holding constant other factors such as mail volume. The cause of the
5 reversal in productivity is not revealed by his analysis, but it seems quite pervasive.
6 Confining attention to statistically significant productivity trends, between 1988 and 1992
7 eight mail processing activities showed gains and five showed declines. But between
8 1992 and 1996, only two categories showed gains, while eight exhibited declines.

9 Table 1: Number of Activities Showing Productivity Gains and Declines

	<u>MODS</u> <u>Sortation</u>	<u>MODS</u> <u>Allied</u>	<u>BMC</u> <u>Sortation</u>	<u>BMC</u> <u>Allied</u>	<u>All</u> <u>Activities</u>
<u>1986-1992</u>					
gains	5	2	1	0	8
declines	4	1	0	0	5
<u>1993-1996</u>					
gains	0	0	2	0	2
declines	2	4	3	1	10

10 Source: Bradley, Tables 7-10, pp. 54, 63, 65, 67.

11 His other indicator of the march of technology is the proportion of the mailstream
12 handled manually. Declines in that proportion, according to his results, are associated
13 with falling labor productivity in manual sorting activities and increasing labor
14 productivity in some other sortation activities.

overflows, which in turn will increase as an increasing proportion of the mailstream is destined for automated processing.

C. Scope of Data Analysis

Professor Bradley's analysis includes a variety of features and diagnostic checks aimed at ensuring that his results are accurate, and not an artifact of erroneous data or faulty analysis. There seems little point in surveying here the measures he has taken to ensure reliable results, since his direct testimony already provides as clear an account as can be expected, given the subject matter. Nevertheless, it may be useful to provide an example of what seems to me his commendable care in handling and analyzing the data.

An example of particular interest is his approach to identifying the shape of the curve relating cost (labor hours) to the volume (e.g., total pieces handled) of mail processing. It is the shape of that curve that lies at the heart of the cost variability of mail processing, so it is extremely important that the analysis applied to the data be capable of identifying the shape of the curve correctly. That task is not as easy as might be imagined. It is common practice to select three or so simple forms of equation (e.g., linear, log-linear, quadratic), and choose the one that appears to fit the data best. But simple forms have limited suppleness, and so even the best of the tested equations may not fit some parts of the data well. For instance, an equation that does a good job of predicting costs for outputs close to the sample mean may badly predict the costs of very small and very large scale operations. Yet for a growing organization, it is particularly important to have accurate information on costs at relatively high output levels.

Professor Bradley's study estimates a relationship between output and cost whose mathematical form is quite complex, a complexity that allows the curve relating cost and

1 output to take on almost any shape, as dictated by the data.¹³ His results indicate that
2 using the flexible functional form was warranted, since a number of the terms in his
3 equation that would not appear in a simpler functional form do turn out to be statistically
4 significant.

5 All in all, there can be little doubt that this study of cost variability constitutes a
6 major step forward in improving understanding of the factors driving Postal Service
7 costs. Its usefulness as an analytic tool might be further expanded if, in future versions of
8 the study, the labor cost of mail processing were measured in dollar terms as well as
9 hours and if the investment in plant and equipment associated each activity at each site
10 were included as explanatory variables. But the study in its current form more than
11 adequately establishes the variability of costs, and the size of the data sets and the
12 thoroughness of the analysis provide ample reason to be confident that the results are
13 reliable.

14 III. Attributing Mail Processing Labor to Individual Postal Services

15 Mr. Degen has been courageous enough to accept the unenviable task of trying to
16 determine the labor costs of mail processing for individual postal services. The
17 information that he draws upon is capable of identifying only to a limited extent the costs
18 of individual services, leaving a large residual of costs that must be either allocated to
19 individual services on the basis of one assumption or another, or classified as institutional

¹³The functional form he fits, often referred to as a translog function, makes the log of the dependent variable (in this case labor hours) a quadratic function of the logs of the explanatory variables.

1 costs. He chooses to attribute the costs to individual services by applying a number of
2 assumptions.

3 His point of departure is to partition mail processing costs into 49 cost pools.¹⁴
4 Each is intended to reflect a relatively homogeneous set of mail processing activities.
5 Within each cost pool, the services responsible for some costs are documented. (These
6 costs are sometimes referred to as “direct” costs.) In addition to the documented costs of
7 individual services, there are two categories of cost for which information is insufficient
8 to identify service responsibility. One is the cost of processing uncounted mixed mail.
9 The other is the cost of staff observed “not handling mail,” which may mean that an
10 employee is on a break, clocking in or out, or at a work station apparently not doing
11 anything.

12 Mr. Degen’s chief task is to decide how the costs not identified with any
13 individual service should be distributed across individual mail subclasses, special services
14 and the general category of institutional costs. His proposed solution is to develop and
15 apply various assumptions about how such costs ought to be allocated to individual
16 services.

17 His central assumption I will refer to, in the interests of brevity, as the CPP
18 assumption, standing for Cost Pool Proportionality. According to that assumption,
19 broadly speaking, a service’s responsibility for pool costs not identified with any
20 particular service (the costs of mixed mail and of not handling mail) is proportional to the

1 service's responsibility for documented (i.e., "direct") costs within the pool. For mixed
2 mail, his application of the proportionality rule quickly becomes complex. Uncounted
3 mixed-mail items are distributed in proportion to the direct costs for items of the same
4 type in the cost pool.¹⁵ (Sixteen categories of item type are defined). Thus, a service
5 accounting for (say) 20% of the documented costs for a particular cost pool and item type
6 (e.g., LSM sorting, flat trays) is assumed to be also responsible for 20% of the costs of
7 uncounted mixed mail attributed to that pool and item type. Similar assumptions are
8 adopted to distribute the costs of unidentified containers.¹⁶ Finally, a service's
9 responsibility for a pool's costs of staff not handling mail is assumed to be proportional
10 to the sum of the service's documented costs and its allocation of mixed mail costs within
11 the pool.

12 As a general matter, whether a study is judged to rely inordinately on assumptions
13 depends on whether the assumptions appear reasonable in light of known fact, whether
14 they have been tested and how significant a role they play in the analysis. Assumptions
15 that are informed by fact are of less concern than assumptions seemingly invented out of
16 thin air and undisturbed by empirical testing. And minor assumptions are obviously of
17 less concern than assumptions that dominate a study's conclusions.

¹⁴The cost pools for MODS offices are defined in terms of groups of related operation codes. BMC and non-MODS cost pools are defined in terms of various combinations of function, activity and machinery type.

¹⁵If the cost pool contains no documented costs for items of the same type, those mixed mail costs are allocated in proportion to the distribution of documented costs of the same type observed after aggregating across all cost pools. The cost of mixed mail in "identified" containers is allocated on a volume basis to mail categories defined by shape and item type. Information on the distribution of subclasses conditional on shape and type is then used to allocate these costs to subclasses.

¹⁶The cost of unidentified containers is allocated to subclasses in proportion to the direct container costs plus identified containers of the same type.

1 In evaluating a methodology that consists largely of assumptions, it seems
2 appropriate to address three basic questions. Do the assumptions seem reasonable in light
3 of known facts? Have the assumptions been subjected to any sort of testing? Does
4 application of the assumptions call for information that is not available? Judged by these
5 criteria, it appears to me that Mr. Degen's methodology has weaknesses that are difficult
6 to ignore.

7 A. Reasonableness of Assumptions

8 Mr. Degen's direct testimony does not seem to offer a rationale for his central
9 assumption.¹⁷ The CPP assumption might, I suppose, be seen as a complicated, cost
10 pool-specific variation on the assumption frequently used in IOCS analysis that a
11 service's responsibility for mixed mail and staff not handling mail is equiproportional to
12 the service's aggregate documented (i.e., "direct") costs. Previous analysis has shown,
13 though, that even on a system-wide basis, the distribution of counted mail items differs
14 markedly from the distribution of mixed mail and, not surprisingly, a bias exists against
15 counting items that (a) contain numerous pieces or (b) are subject to tight dispatch
16 schedules.¹⁸ If even on a system-wide basis a service's documented cost does not predict
17 well the mixed mail cost for which it is responsible, it seems unlikely to be a good
18 predictor for each of the hundreds of combinations of cost pools and item or container
19 types examined by Mr. Degen.

¹⁷His testimony does contain the statement (page 10) that his assumptions constitute a refinement of the existing mixed-mail methodology. George Stigler, a Nobel laureate in economics, once remarked that "refined" is a term that economists reserve to distinguish their own work from that of their peers. In any event, the relevant question here would seem to be not whether the new assumptions are in some sense a

1 For the CPP assumption to be correct, a remarkable set of coincidences would
2 have to occur. Broadly speaking, within each of the cost pools examined by Mr. Degen,
3 every service subclass would have to have an identical ratio of its documented cost to the
4 costs it contributes to uncounted mixed mail (by item or container type) and also an
5 identical ratio of its contribution to the cost of not handling mail to its documented plus
6 allocated mixed mail costs. If there is a reason for that to occur, it is not mentioned by
7 Mr. Degen and I cannot think of what it would be. Indeed, staff “not handling mail,”
8 which accounts for some 40% of all mail processing costs, remains something of a
9 mystery, and much of it may not be a legitimate cost of *any* service.

10 Even though Mr. Degen’s central assumption lacks a rationale, it has an
11 overwhelming influence on the results. By itself, the CPP assumption plays a weightier
12 role than facts (documented costs) in determining the mail processing costs imputed to
13 services. The majority of the costs that Mr. Degen attributes to individual services reflect
14 this apparently arbitrary assumption.

15 There is a quite general reason to feel skeptical about Mr. Degen’s central
16 assumption. The CPP assumption implies that activities in other cost pools provide no
17 useful information on the services responsible for mixed mail and staff not handling mail
18 in a cost pool. But that seems somewhat implausible. For example, it does not seem
19 unlikely that the number of staff not handling mail in (say) a MODS activity would be
20 related to the contemporaneous activity levels of some other MODS groups (e.g., the

refinement, but instead whether there are persuasive reasons to believe that the new methodology allocates costs more accurately than its precursor.

¹⁸Docket No. R94-1 at 3045-3046.

1 manual sorting providing reserves for overflows from automated sorting), while also
2 varying generally with the overall activity level at the facility, insofar as staff can be
3 rapidly deployed from one MODS activity to another in response to work load
4 fluctuations. It may be more realistic, therefore, to view the staff not handling mail in a
5 particular cost pool – insofar as it represents a service cost at all – as being causally
6 related to volumes of mail processed over a much wider range of activities than the
7 particular pool in question.

8 Two examples of wider cost causality can be found in explanations of the rising
9 proportion of mail processing costs accounted for by employees not handling mail. Both
10 examples are consistent with Professor Bradley’s statistical conclusion that the
11 diminishing manual proportion of the mailstream appears to be contributing to falling
12 labor productivity in manual sorting activities while raising labor productivity in some
13 other areas. For simplicity, I will refer to the two explanations respectively as automation
14 refugees and automation backup.

15 1. Automation Backup

16 Falling labor productivity in manual sorting activities might be due to manual
17 sorting being staffed sufficiently to be able to handle overflows that occur when peak
18 demands are placed on automated sorting. If manual sorting operations are scaled to
19 provide the reserve capacity to handle peak loads of mail normally sorted automatically,
20 then the more mail that migrates from manual to automatic sorting, the larger is the staff
21 that must be retained in manual sorting operations to provide reserve capacity for
22 overflows from automatic sortation. Thus, personnel routinely observed “not handling

1 mail” in manual operations could represent a hidden cost of mail normally processed by
2 automated sortation, rather than of the mail normally found in manual operations.¹⁹

3 In that event, Mr. Degen’s CPP assumption could be quite badly off the mark. As
4 a result of heavy migration to automatic sortation, the subclasses that now account for
5 relatively few of the direct tallies in manual sortation could nevertheless be responsible
6 for a large proportion of the costs of staff “not handling mail” in manual operations.
7 Indeed, if that cost is essentially the cost of reserve capacity to handle overflows from
8 automated processing, there may be an *inverse* relationship in such instances between a
9 subclass’s direct tallies and its responsibility for the costs of staff not handling mail, just
10 the opposite of the direct relationship assumed by Mr. Degen.

11 2. Automation Refugees

12 To the extent that automation frees up labor, the outcome is either fewer
13 employees or employees spending a smaller proportion of their time doing actual work.
14 Postal Service employees earning more than they could expect from alternative
15 employment will attempt to hold on to their jobs. To the extent that they succeed, the
16 proportion of time spent not handling mail will tend to rise, as has occurred. Moreover,
17 it should not be surprising if USPS managers were to assign underemployed staff to areas
18 where their low productivity is less conspicuous. In short, the rising amount of time
19 spent by clerks and mail handlers “not handling mail” in many cost pools may have much

¹⁹If that is indeed an explanation of idle labor, it raises two related questions. Are the costs of reserve mail-processing capacity being imputed to the mail services responsible for peak period demands, as they should be? There is nothing in Mr. Degen’s analysis that would appear to make that happen. Second, is the Postal Service overinvesting in service reliability? In other words, would customers prefer service that is sometimes slower but less costly?

1 more to do with the general trend towards automating mail processing than with the
2 particular activities of that cost pool. To the extent that staff not handling mail do
3 systematically account for a higher share of some cost pools, the reason may have much
4 less to do with the documented work of the pool than with the pool's capability to make
5 underemployed workers less conspicuous.

6 In summary, there are reasons to feel skeptical of Mr. Degen's central assumption,
7 which constitutes the backbone of his methodology and dominates his results. For the
8 CPP assumption to be correct, the cost of mixed mail and of staff not handling mail in
9 any one cost pool must be (a) unrelated in any informative way to the activities in any
10 other cost pool and (b) distributed identically to the documented costs within the cost
11 pool. Mr. Degen does not offer a reason that should be so, and I cannot think of one.

12 B. Testing

13 Since Mr. Degen's conclusions rely to a very large extent on assumptions, it
14 would be prudent to test the validity of the assumptions, regardless of whether or not the
15 assumptions appear to be reasonable. The question is not whether his assumptions
16 contain errors (it would be an incredible coincidence if they did not), but rather the
17 magnitude of the errors. More than half of the costs that he imputes to services are the
18 result of his CPP assumption, which therefore merits special attention.

19 So far as I have been able to determine, neither Mr. Degen nor anyone else
20 involved in developing this new cost methodology has attempted to test the validity of the

1 assumptions used to distribute all these costs, even though nothing about the assumptions
2 would render testing impossible. It simply has not been done.

3 The failure to test this central assumption is especially troubling because standard
4 testing procedures could have been employed to quantify the magnitude of error. The
5 CPP assumption that mixed mail costs have the same service distribution for each cost
6 pool and item type as direct tallies can be tested directly in several ways. One could draw
7 a random sample of the cost pools used by Degen and, for each selected pool, draw a
8 special random sample of clerks and letter-handlers clocked into the cost pool at
9 randomly selected points in time. For each sampled employee, then, any mixed mail
10 being handled would be fully counted, along with the direct tallies observed in the
11 sample, so that the service distributions of direct and mixed tallies for each sampled pool
12 could be compared to test Mr. Degen's CPP assumption.

13 A more challenging task would be testing the assumption that the cost of
14 employees found not handling mail has the same service distribution within each cost
15 pool as the sum of documented and allocated mixed mail costs. If employees not
16 handling mail represent reserve capacity, called into action when work loads are heavy,
17 then the proportion of employees found not handling mail should systematically fall as
18 output (e.g., total pieces handled) rises towards its peak. Putting aside employees whose
19 assignments involve matters other than handling mail (e.g., selling stamps), the
20 proportion of non-handlers should approach zero at times of peak loads, unless staffing is

1 excessive.²⁰ If that does occur, then the costs of staff kept on the payroll to accommodate
2 peak loads should be imputed to the mail responsible for those peaks, not to some
3 average of peak and off-peak mailstreams.

4 Suppose, instead, that the proportion of non-handlers is discovered not to drop
5 significantly at times of peak loads. That would tend to suggest chronically underutilized
6 labor, whose expense should be assigned to institutional costs, since there is no
7 meaningful sense in which such hours can be said to represent a cost of any postal
8 service. Assigning the cost of chronically excess labor to institutional costs, however,
9 should be regarded as only an interim measure, until staffing can be brought into balance
10 with work loads.

11 C. Data Demands

12 A methodology to estimate service costs is of little value if applying it requires
13 information that is unavailable or unreliable. For in that event, implementation of the
14 methodology will be possible only with a good deal of guesswork. Even if the
15 methodology were intrinsically reasonable, therefore, little confidence could be placed in
16 the results.

17 It appears to me that Mr. Degen's methodology is crippled by being dependent for
18 its execution on information that is often sketchy, when it exists at all. For example,
19 implementing his CPP assumption involves determining distributions of documented

²⁰Insofar as staff can be rapidly deployed from one activity to another in response to work load fluctuations, the number of employees found not handling mail while clocked into any particular activity may be more closely related to a facility-wide contemporaneous measure of activity than to the work

1 costs for each of many hundreds of combinations of cost pools and item and container
2 types. For many of those combinations, there is no sample data whatsoever from which
3 the distributions called for by his methodology might be inferred. And for many other
4 combinations, the samples are so small that inferences about cost distributions are quite
5 unreliable. For instance, hundreds of distributions of documented costs must be inferred
6 from samples containing fewer than five direct tallies.²¹

7 This means that substantial elements of Mr. Degen's attributions of service cost
8 are random. To understand the significance of that randomness, suppose that the Postal
9 Service's operations were identical in every respect year after year, so no changes in
10 service costs or volumes occurred. Mr. Degen's methodology would nevertheless be
11 capable of attributing in successive years quite different costs to the same service. Those
12 random swings would reflect the large uncertainty associated with the small samples
13 whose use is compelled by his methodology.

14 D. Obtaining Better Cost Estimates

15 Whether there are more reasonable and readily implementable assumptions for
16 determining the service responsibility for mixed mail and not handling costs I leave to
17 others to debate. But in the long run, it should be clear that the only satisfactory
18 arrangement is to replace assumption by fact. That means compiling the information
19 necessary to identify the services actually responsible for these costs now allocated by
20 assumption. Arbitrary, untested assumptions such as Mr. Degen uses are poor substitutes

volume within the MODS activity that a sampled employee is clocked into. That provides another reason to be skeptical of the CPP assumption.

1 for facts. Indeed, they are substitutes only in the unhelpful sense that they create the
2 illusion that service costs are known, even though in reality they are not.

3 In the interim, however, the reality is that no one has many of the facts that would
4 help to determine service costs accurately. And so the immediate question to be
5 confronted is whether, if assumptions are to be used, there is a better set of assumptions
6 than those made by Mr. Degen. That is a matter I happily leave to those more
7 knowledgeable about Postal Service operations. My more modest purpose is simply to
8 point out that it is not necessary, even at this late date, to make large cost allocations that
9 are wholly reliant on untested, arbitrary assumptions. True, the testing that can be done at
10 this late date is limited in depth and scope. But even now, information in the hands of
11 those having long experience with Postal System operations and cost data should be able
12 to cast light on the plausibility of Mr. Degen's assumptions and on whether other
13 procedures for dealing with the cost of mixed mail and staff not handling mail might
14 produce better estimates of service costs.

15 The desirability of utilizing whatever limited cost information is available during
16 this proceeding, though, should not obscure the need for more complete information in
17 the future. The USPS should be strongly encouraged to shift its resources from spinning
18 assumptions to developing data that will allow actual service costs to be determined.
19 That effort need be no more onerous over the long run than the current system for
20 collecting cost information, which does not seem well suited to determining service costs.
21 But if that initiative is to succeed, it must begin with a thoughtful specification of how

²¹MPA-T-2, Docket No. R97-1, at 29.

1 service costs will be estimated, in order to identify the precise data that are needed and
2 how they can best be developed.

3 In the meantime, the Postal Rate Commission may want to consider whether some better
4 cost foundation for developing rates is available in the current case. One possibility is to
5 retain the USPS's cost study, but to eliminate its speculative allocations, classifying as
6 institutional costs all costs not clearly identifiable with individual service classes. Or one
7 might seek a middle ground between that and the Postal Service's proposed reliance on
8 untested arbitrary assumptions. That middle ground could be a methodology that,
9 although not free of assumptions, better uses existing information to formulate reasonable
10 assumptions and yields results that are less sensitive to untested assumptions than the
11 methodology advanced by the Postal Service.

Conclusions

The analysis by Professor Bradley is to be commended for investigating empirically how mail processing costs vary with volume, instead of simply assuming “100 % variability” – an assumption that his research reveals to be quite wrong. His painstaking analysis provides solid insights into cost causation, and one hopes that the study’s reliance on extensive data analysis in lieu of assumptions will provide a model for future studies of Postal Service costs.

In contrast to Professor Bradley’s study, Mr. Degen’s contribution, on the challenging task of identifying the mail processing costs of individual service subclasses, stands on weaker ground. Less than half of his cost allocations to individual services appear to have a basis in fact, and the majority are based on untested, arbitrary assumptions.

For his CPP assumptions to be correct, the cost of mixed mail and of staff not handling mail in any cost pool must be (a) unrelated in any informative way to the activities in any other cost pool and (b) distributed identically to the documented costs within the cost pool. Mr. Degen does not offer a reason that should be so, and I cannot think of one.

Using arbitrary assumption to allocate large costs to individual services should not be confused with actually measuring the costs of individual services and does not provide a suitable basis for developing fair and efficient postal rates. Simply assuming what the costs of services are constitutes a determination not of cost but of cost-recovery.

1 in effect usurping the regulator's role of deciding how costs should be recovered that are
2 not clearly identifiable with individual services. Moreover, significant parts of Mr.
3 Degen's cost allocations are random, since they are governed by data found in unreliably
4 small samples.

5 The USPS should be strongly encouraged to develop the data needed to determine
6 cost causation by service subclass, something that need be no more onerous than the
7 current system for collecting cost information, which does not always seem well suited to
8 determining service costs.

9 In the meantime, the Postal Rate Commission may want to consider whether some
10 better cost foundation is available for developing rates in the current case. One
11 possibility is to retain the USPS's cost study, but to eliminate its speculative allocations
12 by classifying as institutional costs all costs not clearly identifiable with individual
13 service classes. Or, as a middle ground between that and the Postal Service's proposed
14 cost allocations, one might adopt a methodology that makes greater use of existing
15 information and so generates results that are less sensitive to arbitrary assumptions and
16 small samples than the methodology currently being sponsored by the Postal Service.

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1989-1992	PUTNAM HAYES & BARTLETT, INC. <u>Director</u> Conducted studies of the economics of telecommunications, the media, market regulation, and competition policy.
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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon all participants of record in this proceeding in accordance with section 12 of the Rules of Practice.



Joseph H. Fagan

December 30, 1997